

FLORISTICS OF A BOG IN VERNON PARISH, LOUISIANA, WITH COMMENTS ON NOTEWORTHY BOG PLANTS IN WESTERN LOUISIANA

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ABSTRACT

The floristics, species richness, and soil characteristics of a west Louisiana bog are described and compared with other bogs in the area. Noteworthy vascular plants found in bogs in western Louisiana are also discussed.

KEY WORDS: Bog, pitcher plant, hillside seepage bog, Louisiana, floristics, *Sarracenia*, Kisatchie National Forest

INTRODUCTION

In previous papers we have described the floristics of eleven west Louisiana pitcher plants bogs (a.k.a., hillside seepage bogs) (MacRoberts & MacRoberts 1988, 1990a, 1991, 1992). In the present paper we describe the floristic composition, soil conditions, and species richness of one pitcher plant bog located on the Vernon Ranger District of the Kisatchie National Forest, Louisiana, about 50 km south of the other bogs we have studied.

The main reason we undertook this study was to determine if bogs south of our main study area were richer in species composition. They would be expected to be according to biogeographic theory because the bogs we had studied previously are at the northern extreme of the range for this habitat; whereas those in Vernon Parish are in the middle of the range for western Louisiana and eastern Texas (Allen *et al.* 1988; Withers 1980; Nixon & Ward 1986; Bridges & Orzell 1989a, 1989b; Olson 1992).

Since we are also engaged in locating and mapping bogs in the Kisatchie and Vernon Ranger districts, we report briefly on bog species not found at our main study site and on rare and interesting species occurring in this plant community. The bogs of western Louisiana and eastern Texas are isolated from

the main body of bog habitat in the southeastern United States by not only the Mississippi River, but by approximately 250 km of intervening habitat of other types, and they have been so for a long time.

STUDY SITE

Cooter's Bog (a.k.a., Bog 32-4) is located about 11 km NE of Pitkin, Louisiana, in T1N R5W S28. It covers approximately 3.2 ha. Although technically a hillside seepage bog, Cooter's bog has about a 2 percent slope and looks very like the savannah bogs of southeastern Louisiana. It is open with only a few scattered longleaf pines and a few low-growing shrubs, mainly *Magnolia virginica*. At its northwestern corner the bog surrounds a small baygall (see Guillory *et al.* 1990 for a description of baygall habitat). Running through the center of Cooter's Bog is a stream with typical riparian vegetation; this we excluded from our inventory.

In presettlement times Cooter's Bog was embedded in the vast upland longleaf pine forest that stretched across the gulf coastal plain, with only a single disjunction, into west Louisiana and east Texas (Mohr 1897; Smith 1991). Today, longleaf is still the dominant pine in the area.

Cooter's Bog has been burned regularly — usually in the nongrowing season but also in the early summer (Olson 1992). It was burned the winter before our study. *Sphagnum* is a dominant ground cover in only a few sections of the bog where it sometimes forms deep mats, notably in the northwestern section immediately surrounding the baygall thicket.

The climate of Vernon Parish is fundamentally identical to that of the other Louisiana parishes in which we have studied bogs. Summers are hot and humid with temperatures regularly at or above 35°C; mean annual rainfall is about 135 cm, and is fairly evenly distributed throughout the year (Withers 1980).

METHODS

We visited Cooter's Bog at two-week intervals from March through November 1992. Voucher specimens for many of the species were collected. Rare or easily identified plants were not collected. We follow MacRoberts (1984, 1989) and Allen (1992) for scientific nomenclature. Soil samples were taken from the upper 15 cm of the bog and were analyzed by A&L Agricultural Laboratories, Memphis, Tennessee.

As an additional means of measuring species richness, we established two one meter square plots and one twenty-five meter square plot, and recorded species in them every two weeks.

Table 1. Soil characteristics of Cooter's Bog.

		Exchangeable ions (ppm)				
Site	pH	P	K	Ca	Mg	OM%
B1	4.7	3	18	110	28	3.8
B2	4.8	3	14	50	17	3.8
W1	4.6	4	11	70	21	1.7

RESULTS

Table 1 gives soil information for Cooter's Bog. The three samples come from three widely separated and different areas of the bog: B1 and B2 consisted of black sandy soils; W1 was white sandy soil. Table 2 lists the species found in Cooter's Bog.

DISCUSSION

The soil at Cooter's Bog is similar to the soils of bogs we have previously studied. It is described as Ruston fine sandy loam occurring on 1 to 3 percent slopes. It is low in organic matter, acidic, and nutrient poor.

Of the twelve bogs we have inventoried, Cooter's has by far the most species. We found 135 taxa representing 88 genera and 45 families. This is an increase of approximately twenty percent over any bog previously studied. This increase in species richness is reflected also in the sample plots: at Cooter's Bog the 25 meter square plot had 36 species and the two one meter square plots had 26 and 27 species. Species counts made in other years at bogs in the Kisatchie Ranger District 50 km to the north gave between 14 and 22 species (average 18) for ten one meter square plots, and 32 and 33 species for two 25 meter square plots (MacRoberts & MacRoberts 1991).

Cooter's Bog also appears to be richer than bogs in east Texas. Nixon & Ward (1986) report between 88 and 118 species for six bogs but do not give their sizes. Cooter's Bog is however, floristically the same community as the east Texas bogs; while Nixon & Ward do not provide a total list of species for these six sites, they list the 48 species with a presence value greater than 80%. Cooter's Bog has 90% of these.

We have not calculated the Index of Similarity (IS) for each bog pair we have studied, but by combining the eleven Natchitoches Parish bogs and using a presence value of greater than 25% (i.e., present in at least three of the eleven bogs) the IS between Cooter's Bog and the Natchitoches Parish bogs is 77. Clearly, they represent the same plant community.

In a previous paper (MacRoberts & MacRoberts 1992) we described the relationship between bog size and species richness among bogs in Natchitoches

Table 2. Cooter's Bog Species

BLECHNACEAE — *Woodwardia virginica* (L.) Sm.

LYCOPODIACEAE — *Lycopodium alopecuroides* L., *L. appressum* (Chapm.) Lloyd & Underw., *L. carolinianum* L.

OSMUNDACEAE — *Osmunda cinnamomea* L., *O. regalis* L.

PINACEAE — *Pinus palustris* P. Mill.

AMARYLLIDACEAE — *Hypoxis rigida* Chapm.

BURMANNIACEAE — *Burmannia capitata* (Walt.) Mart.

CYPERACEAE — *Carex glaucescens* Ell., *Eleocharis tuberculosa* (Michx.) Roem. & Schult., *Fuirena squarrosa* Michx., *Rhynchospora chalarocephala* Fern. & Gale, *R. elliottii* A. Dietr., *R. globularis* (Chapm.) Small, *R. glomerata* (L.) Vahl., *R. gracilentia* A. Gray, *R. inezpansa* (Michx.) Vahl, *R. latifolia* (Baldw.) Thomas, *R. macra* (C.B. Clark) Small, *R. oligantha* A. Gray, *R. plumosa* Ell., *R. rariflora* (Michx.) Ell., *Scleria reticularis* Michx.

ERIOCAULACEAE — *Eriocaulon decangulare* L., *E. texense* Körn., *Lachnocaulon anceps* (Walt.) Morong., *L. digynum* Körn.

IRIDACEAE — *Sisyrinchium atlanticum* Bickn.

JUNCACEAE — *Juncus debilis* A. Gray, *J. marginatus* Rostk., *J. scirpoides* Lam., *J. trigonocarpus* Steud.

LILIACEAE — *Aletris aurea* Walt., *Melanthium virginicum* L., *Schoenolirion croceum* (Michx.) Wood, *Smilax laurifolia* L., *Zigadenus densus* (Desr.) Fern.

ORCHIDACEAE — *Calopogon tuberosus* (L.) B.S.P., *Platanthera ciliaris* (L.) Lindl., *Pogonia ophioglossoides* (L.) Juss., *Spiranthes longilabris* Lindl., *S. vernalis* Engelm. & Gray.

POACEAE — *Anthaenantia rufa* (Ell.) Schultes, *Aristida purpurascens* Poir. var. *virgata* (Trin.) Allred, *Ctenium aromaticum* (Walt.) Wood., *Dicanthelium acuminatum* (Sw.) Gould & Clark, *D. dichotomum* (L.) Gould *ensifolium* (Baldw.) Gould & Clark, *Eragrostis spectabilis* (Pursh) Steud., *Erianthus giganteus* (Walt.) Muhl., *Muhlenbergia expansa* (Poir.) Trin., *Panicum rigidulum* Bosc ex Nees, *Panicum tenerum* Bey. ex Trin., *Panicum virgatum* L., *Paspalum plicatulum* Michx., *Paspalum setaceum* Michx., *Schizachyrium scoparium* (Michx.) Nash, *S. tenerum* Nees, *Tridens ambiguus* (Ell.) Schultes.

Table 2 (continued).

XYRIDACEAE — *Xyris ambigua* Bey. ex Kunth, *X. baldwiniana* Schultes, *X. caroliniana* Walt., *X. difformis* Chapm. var. *curtissii* (Malme) Kral, *X. drummondii* Malme, *X. louisianica* Bridges & Orzell, *X. scabrifolia* Harper, *X. torta* Smith.

ACERACEAE — *Acer rubrum* L.

ANACARDIACEAE — *Toxicodendron vernix* (L.) Kuntze.

APIACEAE — *Centella asiatica* (L.) Urban, *Eryngium integrifolium* Walt., *Ozypolis filiformis* (Walt.) Britt., *O. rigidior* (L.) Raf., *Ptilimnium capillaceum* (Michx.) Raf.

AQUIFOLIACEAE — *Ilex coriacea* (Pursh) Chapm.

ASCLEPIADACEAE — *Asclepias longifolia* Michx., *A. rubra* L.

ASTERACEAE — *Aster dumosus* L., *A. sericocarpoides* (Small) K. Schum., *Bidens aristosa* (Michx.) Britt., *Boltonia diffusa* Ell., *Cacalia ovata* Walt., *Chaptalia tomentosa* Vent., *Coreopsis linifolia* Nutt., *C. tripteris* L., *Erigeron vernus* (L.) Torrey & Gray, *Eupatorium leucolepis* (DC.) Torrey & Gray, *Eupatorium rotundifolium* L., *Helenium drummondii* H. Rock, *Helianthus angustifolius* L., *Liatris acidota* Engelm. & Gray, *L. pycnostachya* Michx., *Marshallia graminifolia* (Walt.) Small ssp. *tenuifolia* (Raf.) S. Watson, *Pluchea foetida* (L.) DC., *Solidago patula* Muhl.

BETULACEAE — *Alnus serrulata* (Ait.) Willd.

CAMPANULACEAE — *Lobelia reverchonii* B.L. Turner.

CAPRIFOLIACEAE — *Viburnum nudum* L.

CLUSIACEAE — *Hypericum brachyphyllum* (Spach.) Steud., *H. cruz-andreae* (L.) Crantz, *H. setosum* L.

DROSERACEAE — *Drosera brevifolia* Pursh, *D. capillaris* Poir.

ERICACEAE — *Vaccinium corymbosum* L.

FABACEAE — *Tephrosia onobrychoides* Nutt.

GENTIANACEAE — *Bartonia paniculata* (Michx.) Muhl., *Sabatia gentianoides* Ell., *S. macrophylla* Hook

HALORAGIDACEAE — *Myriophyllum aquaticum* (Vell. Conc.) Verdc.

LAMIACEAE — *Hyptis alata* (Raf.) Shinnars, *Scutellaria integrifolia* L.

Table 2 (continued).

LAURACEAE — *Persea borbonia* (L.) Spreng.

LENTIBULARIACEAE — *Pinguicula pumila* Michx., *Utricularia cornuta* Michx., *U. juncea* Vahl., *U. subulata* L.

LINACEAE — *Linum medium* (Planch.) Britt.

LOGANIACEAE — *Cynoctonum sessilifolium* (Walt.) St. Hil.

MAGNOLIACEAE — *Magnolia virginiana* L.

MELASTOMATACEAE — *Rhexia lutea* Walt., *R. mariana* L., *R. petiolata* Walt.

MYRICACEAE — *Myrica cerifera* L., *M. heterophylla* Raf.

NYSSACEAE — *Nyssa sylvatica* Marsh.

ONAGRACEAE — *Ludwigia hirtella* Raf.

POLYGALACEAE — *Polygala cruciata* L., *P. mariana* P. Mill, *P. ramosa* Ell.

ROSACEAE — *Aronia arbutifolia* (L.) Pers.

RUBIACEAE — *Hedyotis boscii* DC.

SARRACENIACEAE — *Sarracenia alata* Wood.

SCROPHULARIACEAE — *Agalinis* sp., *Gratiola pilosa* Michx.

VIOLACEAE — *Viola primulifolia* L.

Table 3. Species found in other bogs of the Vernon Ranger District.

<i>Asclepias lanceolata</i> Walt.
<i>Calopogon barbatus</i> (Walt.) Ames
<i>Lyonia ligustrina</i> (L.) DC.
<i>Platanthera blephariglottis</i> (Willd.) Lindl.
<i>Platanthera cristata</i> (Michx.) Lindl.
<i>Platanthera integra</i> (Nutt.) Gray ex Beck
<i>Platanthera nivea</i> (Nutt.) Spreng.
<i>Pluchea rosea</i> Godfrey
<i>Rhododendron canescens</i> (Michx.) Sw.
<i>Rhododendron oblongifolium</i> (Small) Millais
<i>Rhexia alifanus</i> Walt.
<i>Rudbeckia scabrifolia</i> Brown
<i>Scleria georgiana</i> Core
<i>Solidago rugosa</i> Ait.
<i>Stylisma aquatica</i> (Walt.) Raf.
<i>Viola lanceolata</i> L.

Parish. There is a strong positive correlation between size and number of species present. Cooter's Bog is larger than the other bogs we have studied and it has more species and so fits the area/richness prediction of island biogeography. Richness at Cooter's Bog may be due also to its central location in optimal bog habitat, and to the fact that it is within the range of a number of southern species whose range does not extend much farther north, for example, *Schoenolirion croceum*, *Eriocaulon texense*, *Erigeron vernus*, and *Sabatia macrophylla*.

Bog species found in previous studies but not found at Cooter's Bog are listed in Table 3.

In this section we comment on a few of the more interesting species found in both Kisatchie and Vernon District bogs (voucher specimens for almost all species we have collected in Louisiana bogs are preserved in the Vanderbilt University Herbarium). The information presented here includes both data gathered by Annette Parker, former U.S.D.A. Forest Service Botanist, Vernon Ranger District, Leesville, Louisiana, on bogs on the Vernon District in 1990 and our data on Vernon District and Fort Polk bogs gathered since 1991 (a combined total of 266 bogs surveyed), our data for 155 bogs in the Kisatchie District and 15 bogs adjacent to Forest Service land surveyed since 1987, and our floristic inventory done in 1987 and 1988 of one Winn District bog (notes on file, Kisatchie Ranger District, Natchitoches, Louisiana; Vernon Ranger

District, Leesville Louisiana; Supervisor's Office, Pineville, Louisiana; see also MacRoberts & MacRoberts 1988, 1990a, 1991, 1992; Bridges & Orzell 1989b). The combined sample consists of 437 bogs.

Combining our data with those of Parker gives 305 documented locations for state and federally listed rare, threatened, and endangered bog species. In our area are *Calopogon barbatus*, *Lachnocaulon digynum*, *Lycopodium cernuum*, *Platanthera blephariglottis*, *P. integra*, *Rhynchospora macra*, *Rudbeckia scabrifolia*, *Sabatia macrophylla*, *Xyris drummondii*, *X. scabrifolia*, and *Zigadenus densus*. We also comment on a few species that have not received federal or state recognition. Data collected after June 6, 1993 are not presented here.

Calopogon barbatus is not common in the west gulf coastal plain and has only been found at a few locations. We know of only three sites for it on the Vernon District and one in the Kisatchie District.

Eriocaulon texense, once thought to be uncommon in western Louisiana, has been found in the majority of bogs in the Vernon District where it sometimes forms an almost continuous ground cover. We have never found this species in the Kisatchie District just 30 km north.

We have found *Eriogonum vernus* in two bogs on the Vernon District, apparently the most western point of its range.

Lachnocaulon digynum is an interesting species; it has been found in slightly over 50 bogs on the Vernon District and adjacent Fort Polk and in one bog on the Winn District (MacRoberts 1989) but has never been found on the intervening Kisatchie District.

Lycopodium cernuum was found in Middle Branch Bog (Kisatchie Ranger District) in the late 1970's and early 1980's but has not been found there since, although looked for (MacRoberts & MacRoberts 1988); we have not seen it in any bogs in west Louisiana and east Texas. As it is a conspicuous and easily recognizable species, it is likely that *L. cernuum* will prove to be very rare in the west gulf coastal plain.

Platanthera blephariglottis was first found in western Louisiana as a single stem in a bog on the Vernon Ranger District in August 1990. In September 1992 the site was revisited and three stems were found at two locations in this bog. While identification has not been given the imprimatur of an expert because there are too few stems to warrant collecting, consistently white flowers distinguish these plants from *P. ciliaris* (which is common in this bog).

Until recently, *Platanthera integra* was considered very rare in western Louisiana and east Texas (MacRoberts & MacRoberts 1990b; Orzell 1990) and it remains uncommon; we have found it in nine Kisatchie District bogs, often in large numbers, and since 1989 it has been found in twelve Vernon District bogs.

We have found *Rhynchospora chalarocephala* in two bogs on the Kisatchie District and in one bog on the Vernon District. However, because this species is not easily distinguished in the field, it is probably far more common than

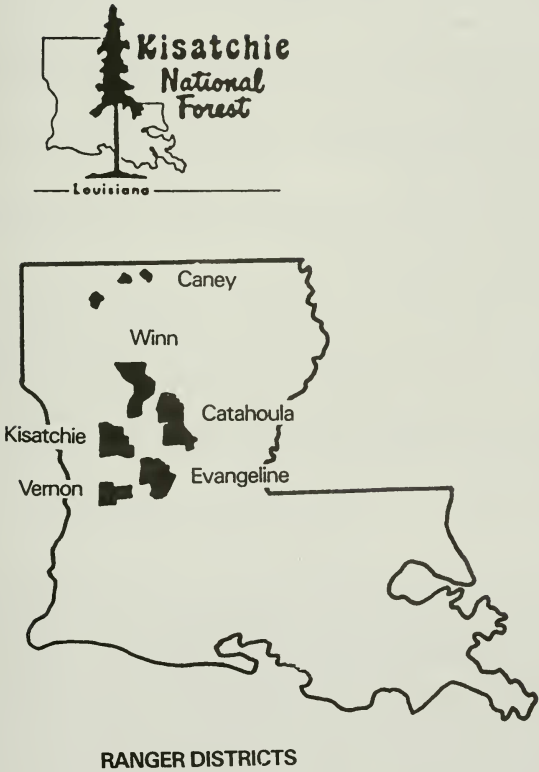


Figure 1. Locations of Ranger Districts in the Kisatchie National Forest.

these numbers indicate (Orzell & Bridges 1989b).

Until recently, *Rhynchospora macra* was thought to be rare in western Louisiana, having been reported from only one bog, but it has now been documented for 28 bogs on the Kisatchie and Vernon districts. Where it occurs – in very wet areas – it is usually abundant.

Rudbeckia scabrifolia, a west gulf coastal plain endemic not described until 1986 (Brown 1986), is often abundant, forming dense stands in bogs and along the bog-baygall ecotone. It is known from 50 bogs on the Vernon District but apparently does not extend north into Natchitoches Parish.

Sabatia macrophylla is known from 48 Vernon District and Fort Polk bogs, where it can be abundant; like *Rudbeckia scabrifolia* it does not extend north into Natchitoches Parish.

Both *Xyris drummondii* and *X. scabrifolia* can be abundant in west Louisiana bogs; the former is known from 74 and the latter from 16 locations on the Kisatchie and Vernon districts.

We have found *Zigadenus densus* in fifteen bogs in the Vernon District and adjacent Fort Polk; it is common in western Louisiana and eastern Texas.

Due to the scarcity of plant community surveys in Louisiana (MacRoberts 1984) and in the west gulf coastal plain in general (Bridges & Orzell 1989a), as bogs and other habitats in this part of Louisiana and adjacent east Texas are more thoroughly investigated, other endemic, relict, and disjunct species should be discovered, and species once considered rare will be found to be much more common (see Bridges & Orzell 1989b; MacRoberts & MacRoberts 1990b; Kral 1983; Orzell 1990).

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